

# LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

Transport Assessment (TR-001-000)

Part 10: Route-wide and off-route assessment

Traffic and transport

November 2013

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**Traffic and transport**

November 2013



## Department for Transport

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## 9 Route-wide and off-route assessment

### 9.1 Introduction

- 9.1.1 This section presents an assessment of the potential impacts of the Proposed Scheme in terms of route wide and off-route impacts.
- 9.1.2 A route-wide transport assessment has been undertaken which considers those impacts that have potential to be wide-area impacts due to activities or changes in travel patterns. This assessment also considers cumulative impacts in relation to the highway network and the NR network.
- 9.1.3 It also assesses the impact of the Proposed Scheme on railheads, the infrastructure maintenance depot, off-route stabling of high-speed trains, modifications to the WCML between Lichfield and Colwich.
- 9.1.4 Those aspects of the construction and operation of the Proposed Scheme that have the potential to generate substantial impacts in locations remote to the route corridor (i.e. 'off-route') are also considered. The nature of the Proposed Scheme means that such impacts are related to implications for other transport infrastructure.
- 9.1.5 Off-route impacts are defined as those that may occur at locations beyond the Proposed Scheme's route corridor and its associated local environment and which are not covered within the spatial scope of the individual CFAs.
- 9.1.6 The sections dealing with the CFAs (London, Country and West Midlands) consider impacts generated 'on-route'; that is to say within the route corridor, the local environment and access routes from London Euston station to Birmingham Curzon Street station and Handsacre.
- 9.1.7 The off-route rail stations impacts are then assessed.
- 9.1.8 This section sets out the potential impacts of the Proposed Scheme for:
- route-wide – construction and operation; and
  - off-route – construction and operation.



## 9.2 Route-wide

- 9.2.1 The spatial extent of the Proposed Scheme is such that consideration of transport impacts at a route wide scale is required. This applies to both the construction and operations phases. This route-wide assessment considers those impacts that have potential wide-area impacts due to activities or changes in travel patterns. In the context of transport, all impacts directly related to activities within an individual CFA area or combined areas are considered within the relevant assessments in earlier chapters in this TA.
- 9.2.2 An initial review of the range of potential impacts was undertaken to identify aspects that might have the potential to have route-wide impacts.
- 9.2.3 It was considered the potential route-wide impacts might arise during construction and operation result from:
- construction-
    - impacts on the strategic highway network during construction;
    - impacts on the wider railway network during construction; and
    - impacts associated with the operation of the Proposed Scheme railheads.
  - operation -
    - impacts arising during operation - changes in passenger demand; and
    - wider impacts associated with the operation of the Infrastructure Maintenance Depot.

## 9.3 Route-wide - construction

### Impacts on the strategic highway network during construction

- 9.3.2 The cumulative impacts of construction vehicles from all construction activities along the Proposed Scheme route have been assessed in the relevant sections of this TA. These have considered the impact of traffic generated by the Proposed Scheme not only immediately adjacent to the route but as far as necessary to identify impacts along access routes or as a result of diversions.

### Impacts on the railway network during construction

- 9.3.3 The assessment of impacts to classic rail services during construction has been based on analyses to identify works to the NR network. This has enabled the likely number, location and nature of works, as well as how they will be implemented to be established. These factors have been used to assess the potential levels of disruption to passenger services on the classic rail network.

- 9.3.4 A number of works on the classic rail network are required, including:
- remodelling station layouts and track alignment to accommodate the Proposed Scheme tracks;
  - protection of existing rail assets where the route crosses over, adjacent to or under existing rail infrastructure;
  - the use of existing rail sidings to support the construction and operation of the Proposed Scheme; and
  - the linkage of temporary construction sidings to the rail network to support the construction process.
- 9.3.5 The potential scale of impact from these works will depend on a number of factors including the type and complexity of interaction, duration of interaction, level of use of the rail line affected and timing of the interaction. For example, railheads, rail sidings and asset protection works will not have a direct impact on the operation of the classic railway as they can be implemented without the need for disruptions to the railway and delay to passenger journeys. However, major track re-modelling has greater potential to affect services. In addition, while most railway works will be undertaken overnight or during weekend possessions (and thus will have limited impacts in isolation), a long programme of such works across a route can, over a period of time, potentially cause disruption to the travelling public and freight services.
- 9.3.6 Planned possession of the classic rail network is a standard technique widely used for the maintenance of the UK railway. A number of standard possessions are used which vary in duration depending on the scale and complexity of the works planned. These range from mid-week night (23:00 – 05:00) possessions, through weekend 54 hour (23:00 Friday – 05:00 Monday) possessions to Bank Holiday weekend 100 hour (01:00 Friday – 05:00 Tuesday) possessions. Longer periods in exceptional circumstances are occasionally planned.

### *Analysis of impacts*

- 9.3.7 Two main types of works are proposed. Firstly, possessions to maintain safety while civil engineering works are taking place over, adjacent to or under the existing railway. Secondly, possessions to maintain safety while actual alterations are being made to the existing railway to accommodate the Proposed Scheme.
- 9.3.8 Proposed Scheme works will be undertaken in compliance with the draft Code of Construction Practice and the Network Rail Rule Book to ensure that disruption to travelling passengers and freight is minimised as far as possible. This includes measures such as carefully programming Proposed Scheme works to coincide with possessions that are required and planned for the general maintenance of the railway, planning of the required works so that

they can be undertaken in short overnight stages when passenger services are not disrupted and programming longer closures at the weekend and on bank holidays to minimise the number of passengers affected.

9.3.9 There are a number of works proposed that are of sufficient scale that they could potentially create disruption and delay to rail passenger and freight services individually. These are outlined below by CFA:

- Euston – Station and Approach area (CFA<sub>1</sub>): removal, modification and re-instatement of existing Network Rail infrastructure at Euston station and its approaches;
- Camden Town and HS1 Link area (CFA<sub>2</sub>): other works in North London which will interact with the existing railway on the North London Line and the freight only Primrose Hill Line;
- Kilburn (Brent) to Old Oak Common area (CFA<sub>4</sub>): construction of Old Oak Common Station to provide an interchange between the Proposed Scheme and Great Western Main Line services, HS1 services, Crossrail services and express services between Heathrow Airport and Paddington;
- Stoke Mandeville and Aylesbury area (CFA<sub>11</sub>): realignment of the Aylesbury to Princes Risborough Line will be required just south of Aylesbury;
- Calvert, Steeple Claydon, Twyford and Chetwode area (CFA<sub>13</sub>): works will be required at Calvert to create a number of proposed facilities including an infrastructure maintenance depot, a construction railhead and off-line realignment of the Oxford Branch Line that will all require amendment to the Network Rail infrastructure;
- North of the Whittington to Handsacre area (CFA<sub>22</sub>): the connection of the Proposed Scheme onto the WCML south of Colwich Junction will require crossover structures of the WCML, track works to tie the Proposed Scheme into the WCML and alterations to power and signalling equipment;
- Washwood Heath to Curzon Street area (CFA<sub>26</sub>): extensive remodelling of the mainline and sidings will be required to accommodate the Proposed Scheme on its approach into Birmingham, where it will run in close proximity to the Water Orton Line at Castle Bromwich Junction, through Washwood Heath infrastructure maintenance depot, under the Stechford to Aston Line, under Aston Church Road and Saltley viaduct before rising up and crossing the Water Orton Line at Duddeston Junction; and
- Curzon Street station (CFA<sub>26</sub>): the station will be constructed in close proximity to the Rugby to Birmingham Line and Moor Street station which is served by the Didcot to Chester Line.

9.3.10 These works have already been considered in the relevant CFAs. They are all relatively localised and short-term in duration and are mostly not expected to have local impacts still less route-wide impacts except as discussed in the following paragraphs.

- 9.3.11 The method for implementing planned works will be through a series of planned possessions of the classic rail network. A number of standard possessions will be used that, depending on the scale and complexity of the works required, will in almost all locations be restricted to mid-week night possessions, weekend 54 hour possessions and bank holiday weekend 100 hour possessions.
- 9.3.12 The type and scale of works proposed will be consistent with those adopted for current maintenance working practices and will not generally substantially disrupt the travelling public. In addition to overnight possessions, there will be a need for some weekend and public holiday possessions where the works are more complex.
- 9.3.13 However, the works at Euston station and its approaches could have the potential to result in route-wide impacts. A large number of possessions will be required at Euston station and its approaches. The great majority of these will be non-disruptive possessions that will be of short duration and will take place during existing engineering possessions (for example, overnight work at Euston can already take place routinely on approximately one third of the station at any one time). These will not have any substantial impacts on passengers.
- 9.3.14 Euston station will remain open during construction of the Proposed Scheme. It is expected that there will be only approximately 20 possessions that would have the potential to cause substantial disruption to passengers, such as weekend works. Some of these possessions will restrict either the operation of part of the station or its approaches. In particular, works to realign platform 15 will require a 16 day possession of the platform; works to permanently remove platforms 9 and 10 and extend platforms 8 and 11 will require a series of six 54 hour possessions; and works to accommodate the Proposed Scheme's platforms will permanently remove platforms 16 to 18.
- 9.3.15 Despite the scale of the works during construction, overall station capacity will be maintained through efficient use of available platform space and there will be only a relatively short period during which train frequency will reduce (with a loss of two morning peak trains and one evening peak train to/from Watford). Once construction is complete, the total number of platforms at Euston Station will increase from the current 18 to 24 comprising 13 classic rail platforms and 11 Proposed Scheme platforms.
- 9.3.16 All of these activities during construction will put pressure on the available capacity and will have a potential impact on network performance and consequent delays to services and passengers on the WCML. The extent of change during construction at Euston station could result in some level of disruption to the services which run on the WCML.
- 9.3.17 In addition, although possessions will almost entirely be overnight and at weekends (and hence affect fewer users), there will be some impact from these widespread possessions over a period that could last for up to 10 years.

Coordination of possessions, many of which are very localised, will substantially reduce the frequency of potential disruption from the total number of possessions at Euston and its approaches.

- 9.3.18 Other works that restrict or remove access include: the replacement of the Chalk Farm Road overbridge that could require temporary (up to 2 weeks) closure of the freight only Primrose Hill Line between Camden Junction and Camden Road Station but diversionary routes are available; the Acton to Northolt freight only Line located west of Old Oak Common will be severed (and not reinstated) but an alternative route is available involving a minor diversion; and works at West Ruislip require the removal of two existing freight sidings.
- 9.3.19 The following are measures that HS2 Ltd will explore to further reduce any impacts on passengers from the disruptive possessions:
- the current access requirements reflect the present development of the design and as the development progresses so too will the maturity of the access requirements;
  - any access to the operational railway will follow the recognised industry planning process controlled by Network Rail (NR);
  - HS2 Ltd will seek to optimise the access to the operational railway across all Proposed Scheme works by planning works in association with the NR enhancement and renewals plans eliminating possessions where possible and use existing railway access where applicable. This harmonisation includes using existing disruptive possessions and maximising the use of published NR track access availability;
  - HS2 Ltd will work with NR to minimise works on routes which would cause disruption to the travelling public on national holidays and on days when major leisure/sporting events are occurring;
  - due to programme constraints, concurrent works at different locations may be required. However HS2 Ltd will seek to programme the works in such a way as to eliminate as far as reasonably practicable concurrent works requiring major possessions of the railway affecting routes into major conurbations e.g. works at Euston concurrent with works affecting the GWML at Old Oak Common and NR;
  - where total closure is necessary, HS2 Ltd will work with NR to keep passengers on trains, albeit with extended journey times via different routes that ultimately reach the original final destination, e.g. if WCML is closed then re-routing passenger trains via the Chiltern Lines into Euston as is done today on occasions;
  - where the final destination is not achievable a similar alternative will be offered e.g. as above but diverted into Paddington or Marylebone;
  - provide rail replacement services where necessary when rail possessions are in

place; and

- provide effective notification of disruption to the travelling public so that non-essential trips can be avoided or alternative routes easily established.

## Railheads

- 9.3.20 Railheads are required along the Proposed Scheme to carry out the day to day logistical operations during the construction of the Proposed Scheme route. More specifically, the railheads will be used for the movement of excavated materials, construction materials deliveries and as an access to the Proposed Scheme route for ballast and track-laying.
- 9.3.21 A total of five facilities are identified along the route comprising a mixture of existing sidings and construction siding railheads specially formed for construction of the Proposed Scheme, as follows:
- Euro Terminal at Willesden (existing sidings);
  - West Ruislip railhead;
  - Calvert railhead;
  - Kingsbury Road railhead; and
  - Streethay.

## *Analysis of impacts*

- 9.3.22 The facilities at West Ruislip, Calvert, Kingsbury Road and Streethay will be temporary facilities which will be established and operated during the construction phase of the Proposed Scheme. They will then be removed once construction is complete. The facility at Willesden utilises established sidings.
- 9.3.23 The railheads will be connected to the classic rail network so that the movements of materials both into and out of the railhead can be made by rail. The local impacts of highway movements associated with the establishment and operation of the railheads are addressed in the consideration of individual CFAs.
- 9.3.24 The number of train movements associated with each of the railheads varies based primarily on the quantity of materials that is to be moved through the railhead.
- 9.3.25 Movements take place over the whole construction period. There will be peaks in activity during the construction programme, especially associated with the movement of excavated material, which will result in the indicative maximum two-way rail movements at each facility shown in Table 9-1. The level of peak movement is generally dictated by the availability of train paths rather than the quantity of material involved.

Table 9-1: Route-wide assessment - two-way rail movements at sidings/railheads

Siding/railhead	Typical train movements entering/exiting sidings/railheads	
	Typical average per week	Peak per week
Willesden	39	69
West Ruislip	21	21
Calvert	34	41
Kingsbury Road	39	54
Streethay	34	49

- 9.3.26 The movement of trains to and from the sidings/railheads on the classic rail network will utilise available train paths and will comprise a very small percentage of total train movements on the classic rail network. No impacts associated with train movements to and from railheads during the construction of the Proposed Scheme are therefore identified.

## 9.4 Route-wide - operation

### Impacts arising during operation - changes in passenger demand

#### *The Proposed Scheme*

- 9.4.2 Alongside the introduction of HS2 services, the expected changes to frequencies, routes and calling patterns on the classic rail network have been determined from the current working assumptions which are contained in the Economic Case for the Proposed Scheme. The analysis is presented for 2026 when the Proposed Scheme is scheduled to become operational and for 2036 with the Phase One network in operation. The 2036 model output has been used to provide consistency with the economic case.
- 9.4.3 The PLANET Model<sup>1</sup> has been used to estimate travel on the Proposed Scheme; other rail services; and other transport modes. Hence it provides mode share information for car, rail and air modes both without and with the Proposed Scheme.
- 9.4.4 Forecasts show increased demands for long distance rail travel in 2026 and 2036. Without the Proposed Scheme, the WCML, ECML, MML and other routes will become increasingly congested. With the Proposed Scheme, new capacity will be introduced into the system with the accompanying reductions in journey times, enhanced passenger experience and reduced congestion and passenger crowding on the classic rail network.
- 9.4.5 The Proposed Scheme will introduce a new high speed and high capacity route between London Euston and Birmingham Curzon Street with

<sup>1</sup> PLANET Framework Model output used in this section is derived from Version 4.2 of the model.

intermediate stations at Old Oak Common and Birmingham Interchange. The Proposed Scheme (i.e. Phase One) will also allow for onward running of classic compatible high speed trains north of Birmingham on the existing WCML to serve Manchester, Liverpool and Glasgow and selected intermediate stations (Phase Two will add further to the high speed network and locations served). At Old Oak Common station, the Proposed Scheme will also provide a link to the HS1 network that will accommodate international trains.

- 9.4.6 The operational timetable for HS Phase One, shown in Table 9-2 and analysed in the Economic Case, models ten trains per hour leaving Euston. All these trains will call at Old Oak Common with three trains per hour progressing to Birmingham Interchange and Birmingham Curzon Street on the Proposed Scheme route and seven progressing to locations north of Birmingham on the Proposed Scheme route and the WCML. Corresponding return services will also operate. Over the 16 hour day this will result in the following daily service pattern:

Table 9-2: HS2 Phase One service patterns

Start and end of route	HS2 Phase One trains	
	Trains per day per direction	Stations served
Euston - Birmingham Curzon Street	48	London Euston, Old Oak Common, Birmingham International and Birmingham Curzon Street
Euston - Manchester Piccadilly	48	London Euston, Old Oak Common, Wilmslow (16), Stockport and Manchester Piccadilly
Euston - Liverpool Lime Street	32	London Euston, Old Oak Common, Stafford (16), Crewe (16), Runcorn and Liverpool Lime Street
Euston - Preston	16	London Euston, Old Oak Common, Crewe, Warrington Bank Quay, Wigan North Western and Preston
Euston - Glasgow Central	16	London Euston, Old Oak Common, Preston and Glasgow Central

- 9.4.7 The passenger seating capacity for trains operating solely on the high speed line has been modelled as 1,100 in the peak period and 550 in the off-peak period. This results in a daily capacity of 39,600 passengers per day in each direction on the Euston to Birmingham Curzon Street route.
- 9.4.8 On services travelling north of Birmingham on the high speed line and the WCML, the seating capacity on each train is modelled at 550 and results in a daily capacity per day in each direction of 17,600 between Euston and Liverpool, 26,400 between Euston and Manchester and 8,800 between Euston and Glasgow.
- 9.4.9 Journey time benefits will be achieved by the introduction of Proposed Scheme. Expected journey times and the comparison with existing are shown in Table 9-3.



Table 9-3: Journey times between key destinations 'without' and 'with' the Proposed Scheme in operation (Phase 1)

Origin / destination	Journey time	
	Without the Proposed Scheme (i.e. current)	With the Proposed Scheme
London Euston - Birmingham Interchange/International	1 hour 14 minutes	38 minutes
London Euston - Birmingham Curzon Street	1 hour 24 minutes	49 minutes
London Euston - Manchester Piccadilly	2 hours 8 minutes	1 hour 40 minutes
London Euston - Liverpool Lime Street	2 hours 8 minutes	1 hour 50 minutes
London Euston - Glasgow Central	4 hours 8 minutes	4 hours

9.4.10 The current journey times quoted above are the quickest timetabled services and so present a robust comparison. Even so, this demonstrates the substantial journey time benefits provided by the Proposed Scheme. For locations north of Birmingham this includes only the benefits associated with Phase One. The biggest proportionate benefits are achieved where the service utilises just the Proposed Scheme route.

9.4.11 Journey times between London and Birmingham are reduced by some 35 minutes, almost halving the current journey time. Similarly journey time savings will also be achieved where the Proposed Scheme route will be used in combination with the WCML to serve locations north of Birmingham, with the journey time between London and Manchester reducing by 28 minutes, a 22% reduction. The subsequent introduction of Phase 2 will further substantially reduce journey times, with the journey time between London and Manchester reducing to 1 hour 8 minutes and between London and Leeds from 2 hours 12 minutes to 1 hour 23 minutes.

### Released capacity

9.4.12 The transfer of long distance passengers from the classic rail network to the Proposed Scheme will create the opportunity to provide additional services and stop services at more locations. Assumptions have been developed at this stage for the purpose of the Economic Case. The actual service patterns, including the use of released capacity, will be determined nearer to opening.

### Analysis of impacts

9.4.13 The general principles underpinning the use of the released capacity have been to increase capacity in corridors with high demand and to address some of the reliability and overcrowding issues that currently exist and that are otherwise forecast to intensify as a result of increased demand for rail travel. Given the introduction of the new long distance high speed services on the

Proposed Scheme, the general approach has been to reduce long distance WCML services and replace them with enhancement of the medium distance and local commuter routes into London and Birmingham.

9.4.14 The assessed timetable in the 2026 base case includes 157 WCML long distance services that will depart per day on the classic rail network from Euston in the 2026 base case. This compares to 246 daily departures in 2026 with the HS2 Phase 1 scenario with 160 of these on the Proposed Scheme line and 86 on the WCML.

9.4.15 Table 9-4 shows a calling comparison of longer distance London trains at key WCML stations. Generally, the table shows a reduction in classic WCML London services serving the mainline stations. Stations south of Birmingham will be enhanced by an increase in commuter services both into Birmingham and into London. Services and stations north of Birmingham will benefit from HS2 trains running on the classic rail network.

Table 9-4: West Coast Main Line base case and with HS2 Phase 1 station-call comparison

Station	2026 base case trains per day	With HS2 Phase 1 only trains per day	
		Released capacity specification trains on the classic network	HS2 Trains
London Euston	157	86	160
Milton Keynes	67	86	-
Watford	23	16	-
Rugby	23	35	-
Coventry	46	32	-
Birmingham International	46	32	48
Birmingham New Street	46	32	48
Wolverhampton	20	32	-
Stafford	16	19	16
Stoke on Trent	30	19	-
Crewe	42	19	32
Wilmslow	20	0	16
Stockport	50	19	48
Manchester Piccadilly	50	19	48
Lancaster	17	8	-
Preston	25	16	32
Glasgow	16	8	16
Edinburgh	0	8	-

Note: For some stations, such as Watford, fewer long distance trains is more than offset by more shorter distance services as set out below.

- 9.4.16 The combination of HS2 trains and WCML trains, including medium and local services, running on the classic network will result, in most cases, in an increase in the service level and capacity at main line stations. Taken together with reductions in passenger loadings through these locations as a result of some users transferring to HS2 trains, these service enhancements can be expected to provide net increases in capacity and reduced crowding with the Proposed Scheme compared to the base without the Proposed Scheme.
- 9.4.17 Table 9-4 does however show some reduction in service level at a limited number of locations. At Coventry, it is considered that Birmingham International provides an attractive high speed alternative. Stoke on Trent has a reduced level of service which is regarded as consistent with the level of demand for long distance travel with access to the HS2 network achieved at Stafford. At Wilmslow, the reduced level of service is regarded as consistent with the level of demand for long distance travel. Finally, the reduced service at Lancaster is considered to be consistent with the level of demand for long distance travel and is off-set by access to the HS2 network at Preston.
- 9.4.18 The reduction in long distance train paths coupled with the reduction in long distance passenger numbers on the WCML will provide benefits in terms of reduced congestion and passenger crowding to the remaining passengers.
- 9.4.19 Additionally, the new capacity provided by the Proposed Scheme in combination with the classic network long distance calling pattern and capacity will provide a benefit to longer distance passengers in that they will experience an increased level of service and improved accessibility.

### **Enhanced commuter services due to released capacity**

- 9.4.20 The released capacity that will occur on the classic rail network has been forecast to allow for a rationalisation of the existing railway timetable including a range of changed frequencies, calling patterns and connections.
- 9.4.21 The general principles underpinning the use of the released capacity have been to increase capacity in corridors with high demand and to address some of the reliability and overcrowding issues that currently exist and that are otherwise forecast to intensify as a result of increased demand for rail travel.

### ***Analysis of impacts***

- 9.4.22 The primary assumptions applied to released-capacity have comprised a reduction in long distance WCML services which will be replaced by an enhancement of the commuter routes into Birmingham and into London which utilise the WCML. The 2026 base case assumptions include 96 departures per day from Euston and 173 departures in the 2026 with HS2 Phase One.

9.4.23 The overall impact on the WCML from the reduction in long distance trains plus the enhancement of commuter services into Birmingham and London will result in 253 London based trains per day in the future baseline, compared to 259 in with the Proposed Scheme. Assuming that all other movements will stay constant, this shows that the released capacity will effectively be re-used by enhancements to the commuter services.

9.4.24 The amended calling pattern results in changes at individual commuter stations as shown in Table 9-5.

Table 9-5: Commuter services base case / with HS2 scenario station call comparison

Station	Base case trains per day	With HS2 (Phase One) trains per day
London Euston	96	173
Watford	89	120
Hemel Hempstead	75	96
Leighton Buzzard	64	81
Bletchley	60	60
Milton Keynes	85	76
Northampton	52	49
Rugby	46	53
Coventry	32	32
Birmingham International	32	32
Birmingham New Street	32	32
Nuneaton	14	16
Tamworth	14	20
Lichfield Trent Valley	14	20
Rugeley	14	10
Stafford	14	16
Stoke on Trent	13	16
Crewe	14	16

9.4.25 The changes that result from the released capacity clearly result in enhancements to the commuter services into London by providing more stopping services at busy stations and more capacity on the busy routes. Both enhancements will contribute to less congestion and crowding.

9.4.26 Of particular note, given the extent of crowding on commuter routes into London, are improvements to the commuter services by providing more

capacity on busy routes and by more stopping services. Both enhancements will contribute to less congestion and crowding.

- 9.4.27 However, there will be some reductions in service levels at a limited number of stations but these will generally reflect the reduced loadings on trains (either users of the station itself or through passengers from other origins) resulting from a number of the users transferring to Proposed Scheme services – or are balanced by increased longer distance services (such as for Milton Keynes).
- 9.4.28 Overall, the use of the released long distance train paths by medium distance and local services, coupled with the reduction in long distance passenger numbers using trains on the WCML, will increase capacity and reduce congestion and passenger crowding.
- 9.4.29 It is also expected that an additional ten train paths each way on the WCML will be available for freight services running between London and the Midlands (each train path is equivalent to 50 HGV per day per direction).
- 9.4.30 This assessment has assumed that there will be no changes to the Proposed Scheme's services between 2026 and 2036. Therefore, the impacts presented here apply generally to both 2026 and 2036 (Phase One). However, it should be noted that, as rail use continues to grow between 2026 and 2036, the need for increased capacity will continue to increase. In addition, with the introduction of Phase Two in 2033, further changes to services could be expected.

### Passenger demand

- 9.4.31 The increased capacity and improved journey times that will result from the Proposed Scheme and the additional services provided to take advantage of released capacity will accommodate the forecast demand for rail travel. The Proposed Scheme will provide an attractive substitute for many users of the long distance rail services that would operate in the absence of the Proposed Scheme. The improvements will also encourage changes in mode share from car and potentially air trips. As well as generating new trips and attracting users of car and air to use HS2 services. The PLANET Model has been used to forecast demand for rail, car and air and to establish the extent of changes in mode share. Forecasts for 2026 and 2036 have been considered for the base case and for the Proposed Scheme scenarios.
- 9.4.32 The PLANET model reports on a national basis and estimates there will be over two million daily long distance trips in 2026 with 74% undertaken by highway, 24% by rail and 2% by air modes. By 2036, long distance travel in the base case is forecast to have increased by 10%, with the majority of these new trips being made by rail.
- 9.4.33 The impact of the Proposed Scheme's capacity and reduced journey times results in over 112,000 passenger trips (combined flow from both directions)

on a typical day in 2026 rising to approximately 142,000 by 2036. Table 9-6 shows these forecast numbers of HS2 passenger trips for 2026 and 2036, the numbers of new trips and for the remainder the mode of travel that they will have transferred from.

Table 9-6: Origin of HS2 passenger trips – typical day

From mode	Origin of trips (average day), combined both directions	
	2026 with HS2 (Phase One)	2036 with HS2 (Phase One)
Classic rail	86,900 (77%)	107,200 (75%)
Generated by the Proposed Scheme	22,100 (19%)	30,600 (21%)
Air	800 (1%)	1,000 (1%)
Car	3,000 (3%)	3,700 (3%)
Total	112,700	142,500

9.4.34 When expressed in annual terms Table 9-7 shows over 34.8 million passengers per annum in 2026 rising to approximately 44 million in 2036.

Table 9-7: Origin of HS2 passenger trips – annual

From Mode	Origin of trips (average day), combined both directions	
	2026 with HS2 (Phase One)	2036 with HS2 (Phase One)
Classic rail	26,840,000 (77%)	33,127,400 (75%)
Generated by the Proposed Scheme	6,821,500 (19%)	9,440,000 (21%)
Air	249,000 (1%)	312,400 (1%)
Car	923,300 (3%)	1,136,000 (3%)
Total	34,833,800	44,015,800

9.4.35 The PLANET Framework Model has been used to identify increases and decreases of daily passenger use of stations. To illustrate the wide spread of these changes, those stations where there is forecast to be a 5% change in passenger numbers (and where there are more than 700 users per day) are shown in Table 9-8.

Table 9-8: Percentage changes in passenger numbers at stations in 2026 and 2036

Station	2026 Phase One	2036 Phase One
	% Change	% Change
Increase		
Runcorn	32%	36%
Wilmslow	16%	18%
Watford Junction	15%	16%
Stafford	12%	15%

Station	2026 Phase One	2036 Phase One
	% Change	% Change
Wolverhampton	12%	13%
Crewe	12%	12%
Rugby	10%	11%
Northampton	10%	10%
Manchester Airport	8%	8%
Decreases		
Wellingborough	-7%	-7%
Cheltenham Spa	-8%	-7%
Lancaster	-8%	-8%
Coventry	-8%	-8%
Leamington Spa	-14%	-11%
Worcester Shrub Hill	-14%	-14%
Salford Central	-21%	-22%

9.4.36 The stations where growth is shown are either stations that will be served by the Proposed Scheme or those that benefit from additional services as a result of released capacity and less crowded trains. Stations where there are reductions are generally relatively close to Proposed Scheme services and it is expected that a number of passengers would use a Proposed Scheme station for convenience and other benefits.

9.4.37 The introduction of the Proposed Scheme will increase the number of annual long distance rail trips and reduce long distance vehicle trips. This is quantified Table 9-9 and shows an increase in rail trips in 2026 of approximately 8 million rising to 10.9 million in 2036. There is a corresponding fall in long distance vehicle trips of approximately 900,000 in 2026 rising to 1.1 million in 2036.

Table 9-9: Changes in annual long distance trips resulting from mode shift

	2026 with HS2 Phase 1	2036 with HS2 Phase 1
Annual change in rail passenger trips as a result of HS2 Phase 1	+ 8 million	+10.9 million
Annual change in vehicle trips as a result of HS2 Phase 1	- 0.9 million	- 1.1 million

9.4.38 The transfer of passengers from the classic rail network and from mode transfer from car will result in reduced forecast future congestion on both the strategic highway and the classic rail networks. The extent of reduction in vehicle kilometres as a result of the Proposed Scheme is quantified in Table 9-10

Table 9-10: Reduction in vehicle-kilometres resulting from mode shift

	Reduction in vehicle kilometres	
	2026 with Proposed Scheme	2036 with Proposed Scheme
Annual reduction in vehicle kilometres as a result of mode shift to HS2 Phase 1	181.7 million	211.9 million

9.4.39 The extent of change in annual vehicle kilometres on strategic long distance highway routes will result in some level of relief of congestion and improvement in traffic speeds (or provide the opportunity to accommodate growth in overall travel demands), particularly on the West Midlands to London highway corridor.

9.4.40 The overall change in rail travel, with some 20% of HS2 trips being new, demonstrates the levels of travel suppressed by current capacity constraints and journey times and shows the substantial travel opportunities and aspirations that the Proposed Scheme and the released capacity services realise.

### Infrastructure maintenance depot

9.4.41 The Calvert infrastructure maintenance depot (IMD) is the facility from which the maintenance of all Proposed Scheme infrastructure will be delivered and resourced.

9.4.42 The IMD will contain all facilities required to carry out day to day maintenance operations as well as supporting major maintenance campaigns such as ballast cleaning and track renewals for the life of the Proposed Scheme asset.

9.4.43 The facility is located near Calvert in Buckinghamshire.

### Analysis of impacts

9.4.44 The IMD will be connected to the classic rail network so that all movements of materials both into and out of the IMD can be made by rail. The local impacts of highway movements associated with the establishment and operation of the IMD are addressed in the earlier sections of the TA.

9.4.45 The typical number of train movements entering and exiting the site associated with the operation of the IMD facility per week is shown in Table 9-11. There are not expected to be any particular peaks of activity.

Table 9-11: Train movements associated with IMD

Movement	Typical average train movements entering/exiting IMD (per week)
Entering/exiting via classic rail network	7 in / 7 out (typically in daytime)
Entering/exiting via HS2 line	28 out / 28 in (typically at night time)



- 9.4.46 In summary, the movement of trains to and from the IMD on the classic rail network will utilise available train paths and will comprise a very small percentage of total train movements on the classic rail network. There are therefore no impacts to assess associated with train movements to and from the IMD.

## 9.5 Off-route - construction

### Modifications to the WCML between Lichfield and Colwich

- 9.5.2 A limited number of changes to the existing WCML infrastructure and its connections to the Chase Line and North Staffordshire Line, will be required to facilitate the proposed connection with the Proposed Scheme at Handsacre and to maintain operational flexibility on the existing WCML railway.
- 9.5.3 The Proposed Scheme in this area includes the construction of new signalling equipment to control train movements, track alignment alterations, some additional crossovers to allow trains to switch tracks, some minor alterations to overhead line electrification to accommodate the track alterations and the provision of ancillary line-side equipment associated with the above.

### *Analysis of impacts*

- 9.5.4 An assessment of the transport impacts for the A515 Handsacre main compound is reported elsewhere in the TA. The other main traffic movements will be associated with the satellite compounds at Armitage Shanks and the A51. Due to the limited scope of the works, the number of daily trips to the compounds is expected to be low. The maximum flow is likely to be less than 70 vehicle movements a day to and from the Armitage Shanks compound and fewer than 200 daily vehicle movements associated with the A51 compound. Vehicle movements at individual work sites will occur around the period of the rail possessions to undertake the works; however, the number of movements associated with each site is expected to be low, with movements occurring for one to two days either side of the individual railway possessions.
- 9.5.5 The works to the WCML between Lichfield and Colwich will not require any changes to be made to routes of PRoW, but will occasionally require movement of construction vehicles along access routes that are also PRoW. This is not expected to give rise to any substantial impacts, due to the small number of movements expected and short duration of the works.
- 9.5.6 The draft CoCP outlines provisions to ensure that traffic and transport impacts are minimised during construction (draft CoCP, Section 14).

## 9.6 Off-route - operation

### Off-route stabling of HS2 trains

- 9.6.2 Upon completion of the Proposed Scheme, HS2 trains will run on the classic rail network to reach Glasgow, Liverpool and Manchester. A Phase One

Stabling Strategy North of Birmingham has been prepared which identifies that off-route stabling facilities will be required to accommodate the stabling, cleaning and servicing of HS2 trains.

9.6.3 Four existing depots have been identified as available to provide off-route stabling as follows:

- Edge Hill, Liverpool;
- Polmadie, Glasgow;
- Longsight, Manchester; and
- Longsight International, Manchester.

### *Analysis of impacts*

9.6.4 The stabling of HS2 Classic Compatible trains is proposed at Edge Hill, Longsight and Polmadie. All three depots are currently operational. A further requirement is to stable HS2 Reserve Units. The Edge Hill and Longsight International sites are identified as available and suitable for this use. They utilise facilities that are currently disused.

9.6.5 Highway movements associated with the use of these facilities will be minimal and associated with minor construction and refurbishment activities during construction and maintenance, cleaning staff and materials and waste movements during operation.

9.6.6 Indeed it is expected that generally each HS2 train stabled will replace an existing Pendolino train. Consequently there would be no net change in activity.

9.6.7 Overall, the number of additional traffic movements at each site is likely to be limited and as the sites are located within urban areas and within currently operational depots, it is considered that additional traffic movements will not be substantial in the context of the existing environment.

### **Off-route stations**

#### *Overall Methodology*

9.6.8 The first stage was to undertake a high level sift to establish which off-route stations would be impacted by the operation of the Proposed Scheme, in terms of a change in passenger numbers and which might experience transport impacts.

- 9.6.9 The identification of stations for assessment of off-route effects is based upon consideration of criteria for traffic and transport impacts. In this context it is considered that less than a 10% change in use (measured in this context in terms of station footfall) is a reasonable threshold for when impacts on transport infrastructure could become significant and when changes in traffic might affect pedestrian and cyclist severance. In addition, a criterion is necessary to identify potential effects on traffic congestion and delays, which needs to recognise the capacity of access routes.
- 9.6.10 The second stage was to analyse the impacts on transport at the off-route stations to identify where impacts from a change in passenger numbers was potentially substantial.
- 9.6.11 A minimum change in likely highway use of 5% has been adopted for this and this has been factored up to an equivalent daily change in rail passengers. If the station is served by a busy urban single carriageway road then a lower threshold of a change of 700 users per day is considered appropriate. A higher threshold of 1400 users per day has been used if higher capacity dual carriageway access is available. Below these thresholds, the potential impact on transport facilities, congestion, air quality and sound, noise and vibration would be negligible.
- 9.6.12 The passenger threshold was based on the following assumptions:
- 60 car trips (car/taxi) per 100 rail passengers;
  - 20% of the daily passengers would arrive and depart in the peak hour; and
  - a two way single carriageway road link capacity of 1,500 to 1,900 vehicles per hour (and a capacity of 4,000 to 5,000 vehicles per hour for a dual carriageway) with a 5% change in traffic flows representing:
    - some 75 to 95 trips in the peak hour per direction for a single carriageway road; or
    - some 150 to 190 trips in the peak hour per direction for a dual carriageway road.
- 9.6.13 Using the above criteria to convert rail passengers into traffic flows, indicates a daily change in passenger numbers of approximately 600 to 800 for a single carriageway road and approximately 1,400 to 1,600 for a dual carriageway road would result in a 5% change in traffic flows on the local road network in the peak hour. For sifting purposes, an average increase of 700 and 1,400 was used as the passenger threshold for a single carriageway and dual carriageway road respectively.
- 9.6.14 These represent a reasonable worst case initial sift as the forecast growth in passenger numbers will be dispersed over the road network and diluted by background traffic flows on the local highway network.

### **Forecast changes in passenger demand**

- 9.6.15 Data from the PLANET Framework Model (PLANET) was used to obtain forecast changes in passenger demand at off-route stations. Daily passenger

trips for Phase One in 2036 were provided from PLANET and the forecast change in passenger demand at the off-route stations is shown in Table 14 for all stations with changes in excess of a 5% change in demand.

Table 9-12: Change in passenger demands

Station	Change in daily passenger demand due to HS2 Phase One (2036)	
	Change in footfall	% change
Stations with an increase greater than 700 users per day and 5%		
Crewe	2,389	12%
Manchester Airport	1,155	8%
Northampton	2,549	10%
Stafford	1,886	15%
Rugby	1,248	11%
Runcorn	2,822	36%
Watford Junction	18,864	16%
Wilmslow	1,162	18%
Wolverhampton	4,073	13%
Stations with an increase of 5% but less than 700 users per day		
Macclesfield	396	6%
Holyhead	56	10%
Truro	161	6%
Stations with a decrease of over 700 users per day and 5%		
Coventry	-2,634	-8%
Lancaster	-914	-8%
London Paddington	-92,776	-7%
Wellingborough	-2,581	-7%
Leamington Spa	-4,033	-11%
Worcester Shrub Hill	-1,964	-14%
Cheltenham Spa	-2,138	-7%
Salford Central	-4,904	-22%
Stations with a decrease of over 5% but less than 700 users per day		
Nuneaton	-485	-7%
Penrith (North Lakes)	-244	-7%
Market Harborough	-377	-8%

- 9.6.16 12 stations are forecast to experience an increase in daily passenger demand greater than 5% as a consequence of the operation of the Proposed Scheme and these are considered further in this chapter.
- 9.6.17 12 stations are forecast to experience a decrease in daily passenger demand greater than 5%, with reductions ranging from 7% to 22%, which reflects the opportunity to divert to more convenient faster Proposed Scheme services. This will have the benefit of releasing capacity on the existing rail network, as well as on the traffic and transport network local to the off-route stations.

### Sifting of stations

- 9.6.18 Table 15 shows which of the off-route stations will experience an increase in usage greater than the sift thresholds of 10% or 700 passenger trips.

Table 9-13 Station sift

Station	Increase >700 or >1,400 daily trips	Increase >10%	Further analysis required
Stations with an increase of greater than 700 trips and 5%			
Crewe	Yes	Yes	Yes
Manchester Airport	No	No	No
Northampton	Yes	Yes	Yes
Stafford	Yes	Yes	Yes
Rugby	Yes	Yes	Yes
Runcorn	Yes	Yes	Yes
Watford Junction	Yes	Yes	Yes
Wilmslow	Yes	Yes	Yes
Wolverhampton	Yes	Yes	Yes
Stations with an increase of 5% but less than 700 trips			
Macclesfield	No	No	No
Holyhead	No	No	No
Truro	No	No	No

- 9.6.19 Although the change at Manchester Airport exceeded the 700 users per day threshold (the increased usage was below the 10% threshold), the station is served by a direct link to the M56 (and other direct highway access) and this indicates that the higher threshold of 1,400 users per day should be applied. The increase at Manchester Airport does not exceed this and therefore this station has not been the subject of further analysis.
- 9.6.20 For Wilmslow, it is expected that the forecast increase will include a proportion of passengers interchanging to other rail services to reach other

local stations. It expected that this will reduce the number of passengers leaving Wilmslow station to below the 700 users per day threshold. Consequently, Wilmslow station has not been considered for further analysis.

- 9.6.21 The impacts at Watford Junction are considered as part of the London regional assessment and are not considered further in this chapter.
- 9.6.22 For the remaining six stations a more detailed analysis has been undertaken, which is set out below.

### **Stations requiring further analysis**

- 9.6.23 The sifting process shows that the following stations will require more detailed analysis to determine whether there will be any substantial transport impacts local to the stations:

- Crewe;
- Northampton;
- Rugby
- Runcorn;
- Stafford; and
- Wolverhampton.

### *Stage 2 - Analysis of impacts*

- 9.6.24 In terms of transport impacts, the focus was on changes to the number of cars and taxis accessing the station as a result of the operation of the Proposed Scheme, as this was likely to have the potential to give rise to more substantial impacts on the operation of the transport network compared to bus use, walking and cycling. Existing commercial bus operators determine the frequency of bus services and would be expected to account for any changes in passenger demand when planning future services.

### **Methodology**

- 9.6.25 Existing conditions at the off-route stations were established through site visits, specially commissioned traffic surveys and data from local authorities. The traffic surveys were undertaken in July and October 2013 and comprised:
- junction turning counts;
  - automatic traffic counts;
  - car park demand surveys; and
  - drop-off/ pick-up surveys.
- 9.6.26 For the purpose of analysis, the highway peak hours were taken as 08:00-09:00 and 17:00-18:00.

- 9.6.27 The existing vehicular trip generation at each off-route station was established from the traffic surveys and the future baseline for the year of assessment, 2041, was estimated by applying growth in line with the DfT's Trip End Model Presentation Program (TEMPO)<sup>2</sup>.
- 9.6.28 The following process was used to establish the trips generated by the operation of the Proposed Scheme at each off-route station:
- existing station traffic flows were growthed to 2036 using TEMPO to align with the PLANET forecast year;
  - the 2036 trip generation was increased in line with the forecast percentage growth in passengers due to the Proposed Scheme;
  - as the forecast year being used in this assessment is 2041, an uplift factor of approximately 10% was applied to the 2036 Proposed Scheme generated trips to produce 2041 forecasts with the Proposed Scheme; and
  - the 2041 future baseline traffic flows were deducted from the 'with the Proposed Scheme' traffic flows, to give the trips generated by the Proposed Scheme.
- 9.6.29 The following process was used to establish the impacts on the local road network at each off-route station that met the peak hour threshold trip generation criteria of vehicle movements:
- the future baseline traffic flows on the local road network for the year of assessment, 2041, were estimated by applying growth in line with TEMPO;
  - the Proposed Scheme generated trips estimated in Stage 1 were distributed onto the road network based on the existing turning movements/proportions recorded in the traffic surveys;
  - the trips generated by the Proposed Scheme were added to the 2041 future baseline traffic flows to establish 2041 'with the Proposed Scheme' traffic flows; and
  - a comparison of the future baseline and 'with the Proposed Scheme' traffic flows was carried out to establish whether the Proposed Scheme will have a substantial impact on the local road network.
- 9.6.30 The estimated trip generation at each off-route station and where applicable, the impact on the local road network is described in the following sections.
- Crewe railway station*
- 9.6.31 The Proposed Scheme is planned to have trains stopping at Crewe station, which is expected to result in increased passenger demand. It is forecast that by 2036, passenger demand at Crewe station will increase by 12% as a result

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<sup>2</sup> The forecasts of traffic growth were taken from the Department of Transport's National Trip End Model (NTEM) forecasts contained within the TEMPO software package.

of the Proposed Scheme (as compared to the future baseline) and that by 2041 this figure will increase to 13%.

- 9.6.32 Crewe station is located on Nantwich Road around 1km southeast of the town centre. The station is bordered to the west by rail infrastructure, offices and the Alexandra Stadium and beyond are residential areas. To the east, there are industrial and retail units.
- 9.6.33 Vehicular access to Crewe station is off the A534 Nantwich Road, where there is a one way loop at the station frontage for taxis and drop-off/pick-up trips. Nantwich Road is a local distributor, which to the west connects with the A5019 Mill Street and to the east, the A532 Weston Road. The station car parks are accessed off Pedley Street, which connects with Nantwich Road at its southern end and Mill Street to the west.
- 9.6.34 To establish the existing station trip generation, traffic surveys were undertaken at the car park accesses on Pedley Street and the drop off facility on Nantwich Road.
- 9.6.35 Future baseline traffic volumes are forecast to grow by around 15% by 2041 compared to 2013.
- 9.6.36 The existing vehicular trips to and from the station, along with the future baseline trip generation for 2041 and the estimated trip generation for the Proposed Scheme is shown in Table 16.

Table 9-14: Crewe station trip generation - existing, future baseline, Proposed Scheme

Time period	Arrivals				Departures			
	Car park	Kiss and Ride	Taxi	Total	Car park	Kiss and Ride	Taxi	Total
Existing station trip generation								
AM peak	52	49	22	123	9	47	19	75
PM peak	24	26	21	71	76	26	21	123
Future baseline trip generation (2041)								
AM peak	59	57	25	141	10	54	22	86
PM peak	27	30	24	81	87	30	24	141
HS2 generated trips (Phase One, 2041)								
AM peak	8	8	3	19	1	7	3	11
PM peak	4	4	3	11	12	4	3	19

- 9.6.37 It is estimated that the Proposed Scheme will generate 30 trips in the morning peak hour and 30 trips in the evening peak hour, compared to a future baseline trip generation of 227 and 222 respectively. The peak hour trip generation is only 40% of that considered to be substantial in the sift criteria (75 to 95 trips for a single carriageway road) and as a consequence, the



Proposed Scheme will not have a substantial impact on the local road network and no further analysis is considered necessary.

- 9.6.38 There may be an increase in parking demand and use of drop-off facilities as a result of the increased passenger numbers using the station. The station owner/operator and the local highways authorities may need to give consideration as to any measures to control traffic and parking in the area.

#### *Northampton railway station*

- 9.6.39 The use of released capacity provides potential for service improvements and reduced crowding for passengers at Northampton station, which is expected to result in increased passenger demand. It is forecast that by 2036, passenger demand at Northampton station will increase by 11% as a result of the Proposed Scheme (as compared to the future baseline) and by 2041 this figure will increase to 12%.
- 9.6.40 Northampton station is located approximately 800m west of the town centre. The station is bordered by the A5095 St. Andrew's Road to the east and the A4500 Black Lion Hill to the south. The western boundary is marked by the River Nene and the northern boundary by a building material supplier.
- 9.6.41 Vehicular access to Northampton station is off the A5095 St. Andrew's Road and the A4500 Black Lion Hill, where there is a one way loop at the station frontage for taxis and drop-off/pick up trips. The station car parks are accessed off the A5095 St. Andrew's Road and the A4500 Black Lion Hill. The A4500 Black Lion Hill connects to the A5095 St. Andrew's Road and the A4500 St. Peter's Way to the east. The A5095 St. Andrews Road joins the A428 Grafton Street/Spencer Bridge Road to the north and the A4500 St. Peter's Way to the south.
- 9.6.42 A new station building to improve capacity is currently under construction to replace the existing station and this will include closure of the A4500 Black Lion Hill access to traffic and changes to the local road network to improve the accessibility of the A5095 St. Andrew's Road access. The new station is due to open in late 2014.
- 9.6.43 To establish the existing station trip generation, traffic surveys were undertaken on the station access off the A5095 St. Andrew's Road. Car park and drop off activity was not surveyed due to the disruption of the station improvement works, which included the closure of the A4500 Black Lion Hill access.
- 9.6.44 Future baseline traffic volumes are forecast to grow by around 24% by 2041 compared to 2013.
- 9.6.45 The existing vehicular trips to and from the station, along with the future baseline trip generation for 2041 and the estimated trip generation for the Proposed Scheme is shown in Table 17.

Table 9-15: Northampton station trip generation - existing, future baseline, Proposed Scheme

Time period	Arrivals	Departures
Existing trip generation		
AM peak	265	159
PM peak	191	266
Future baseline trip generation (2041)		
AM Peak	329	197
PM Peak	236	329
HS2 generated trips (Phase One, 2041)		
AM Peak	36	22
PM Peak	26	37

9.6.46 It is estimated that the Proposed Scheme will generate 58 trips in the morning peak hour and 63 trips in the evening peak hour, compared to a future baseline trip generation of 526 and 565 respectively. The peak hour trip generation is below the range of trips considered to be substantial in the sift criteria (75 to 95 trips for a single carriageway road) and as a consequence, the Proposed Scheme will not have a substantial impact on the local road network and no further analysis is considered necessary.

9.6.47 There may be an increase in parking demand and use of drop-off facilities as a result of the increased passenger numbers using the station. The station owner/operator and the local highways authorities may need to give consideration as to any measures to control traffic and parking in the area.

### *Rugby railway station*

9.6.48 The use of released capacity provides potential for service improvements and reduced crowding for passengers at Rugby station, which is expected to result in increased passenger demand. It is forecast that by 2036, passenger demand at Rugby station will increase by 11% as a result of the Proposed Scheme (as compared to the future baseline) and by 2041 this figure will increase to 12%.

9.6.49 Rugby station is located on Railway Terrace approximately 1km northeast of the town centre. The station is bordered to the north by offices and warehousing and to the south by residential areas.

9.6.50 Vehicular access to Rugby station is off Railway Terrace, where there is a taxi/drop off and pick up facility on street. Railway Terrace connects with Mill Road and Murray Road to the east and the B5414 Clifton Road to the south. Mill Road passes under the railway line where the road narrows to a single lane and connects with Butlers Leap to the north. Murray Road connects with the B5414 Clifton Road, Whitehall Road and Lower Hillmorton Road. The station has three car parks located on Railway Terrace, Murray Road and Mill Road.

- 9.6.51 To establish the existing station trip generation, traffic surveys were undertaken at the car park accesses on Railway Terrace, Murray Road and Mill Road and at the drop off facility on Railway Terrace.
- 9.6.52 Future baseline traffic volumes are forecast to grow by approximately 20% by 2041 compared to 2013.
- 9.6.53 The existing vehicular trips to and from the station, along with the future baseline trip generation for 2041 and the estimated trip generation for the Proposed Scheme are shown in Table 9-16.

Table 9-16: Rugby Station Trip Generation - Existing, Future Baseline, Proposed Scheme

Time Period	Arrivals			Departures		
	Car Park	Drop Off	Total	Car Park	Drop Off	Total
Existing Station Trip Generation						
AM Peak	150	137	287	14	137	151
PM Peak	14	137	151	150	137	287
Future Baseline Trip Generation (2041)						
AM Peak	181	165	346	17	165	182
PM Peak	17	165	182	181	165	346
HS2 Generated Trips (Phase 1, 2041)						
AM Peak	22	20	42	2	20	22
PM Peak	2	20	22	22	20	42

- 9.6.54 It is estimated that the Proposed Scheme will generate an additional 64 vehicular trips in the morning peak hour and an additional 64 trips in the evening peak hour at Rugby station. The peak hour trip generation is below that considered to be significant in the sift criteria (75 to 95 trips for a single carriageway road) and, as a consequence, the Proposed Scheme has not been identified as having a significant impact on the local road network.
- 9.6.55 There may be an increase in parking demand and use of drop-off facilities as a result of the increased passenger numbers using the station. The station owner/operator and the local highways authorities may need to give consideration as to any measures to control traffic and parking in the area.

### *Runcorn railway station*

- 9.6.56 The Proposed Scheme is planned to have trains stopping at Runcorn station, which is expected to result in increased passenger demand. It is forecast that by 2036, passenger demand at Runcorn station will increase by 36% as a result of the Proposed Scheme (as compared to the future baseline) and that by 2041, this figure will increase to 40%.

- 9.6.57 Runcorn station is located on Shaw Street approximately 600m southwest of the town centre. The station is bordered to the north by the A557 Weston Point Expressway and to the east by the elevated A533 Queensway. The area from the southwest to the southeast of the station is predominantly residential.
- 9.6.58 Vehicular access to Runcorn station is off Shaw Street which connects to the B5155 Greenway Road and via Cavendish Street, the A533 Queensway, Station Road and Picow Farm Road. Holloway is accessed off Picow Farm Road. The station forecourt is at the end of Shaw Street where there is a turning circle, with holding area for taxis and a drop off/pick up area. The station has three car parks including two on Shaw Street and one on Holloway.
- 9.6.59 To establish the existing station trip generation, traffic surveys were undertaken at the car park accesses on Shaw Street and Holloway and at the drop off facility in the station forecourt.
- 9.6.60 Future baseline traffic volumes are forecast to grow by approximately 22% by 2041 compared to 2013.
- 9.6.61 The existing vehicular trips to and from the station, along with the future baseline trip generation for 2041 and the estimated trip generation for the Proposed Scheme is shown in Table 18.

Table 9-17: Runcorn Station Trip Generation - Existing, Future Baseline, Proposed Scheme

Time Period	Arrivals				Departures			
	Car Park	Kiss and Ride	Taxi	Total	Car Park	Kiss and Ride	Taxi	Total
Existing Station Trip Generation								
AM Peak	34	35	24	93	4	25	21	50
PM Peak	10	43	17	70	50	51	18	119
Future Baseline Trip Generation (2041)								
AM Peak	42	43	29	114	5	31	26	62
PM Peak	12	53	21	86	61	62	22	145
HS2 Generated Trips (Phase 1, 2041)								
AM Peak	16	16	11	43	2	12	10	24
PM Peak	5	21	8	34	23	24	8	55

- 9.6.62 It is estimated that the Proposed Scheme will generate 67 trips in the morning peak hour and 89 trips in the evening peak hour, compared to a future baseline trip generation of 176 and 231 respectively. The peak hour trip generation is within the range of trips considered to be substantial in the sift criteria (75 to 95 for a single carriageway road trips).

9.6.63 The existing, future baseline and 'with the Proposed Scheme' traffic flows for the morning and evening peak hours are shown in Tables 19 and 20, along with the percentage impact on road links and junctions.

Table 9-18: Runcorn station - percentage impacts - AM peak

Link	2013 Existing	2041 Base	2041 with HS2	HS2 Trips	% HS2 Impact
Station Road	210	251	262	11	4.3%
A533 Queensway slip road	153	183	193	10	5.2%
Cavendish Street (between Lowlands Road and A533 Queensway slip road)	341	408	429	20	5.0%
Lowlands Road	24	29	29	1	2.6%
Cavendish Street (between Lowlands Road and Shaw Street)	165	197	250	53	26.8%
Picow Farm Road	370	443	475	32	7.2%
Shaw Street (station access/forecourt)	109	130	183	53	40.6%
Shaw Street (between Cavendish Street and Car park entrance)	147	176	203	27	15.5%
Shaw Street (between Car park entrance and B5155 Greenway Road)	130	156	174	19	12.1%
Victoria Road	222	267	276	9	3.4%
B5155 Greenway Road (north of Shaw Street)	549	658	662	4	0.6%
B5155 Greenway Road (south of Shaw Street)	526	630	635	6	0.9%
Junctions					
A533 Queensway slip road / Station Road	351	420	441	20	4.9%
Lowlands Road / Cavendish Street	445	533	586	53	9.9%
Cavendish Street / Shaw Street	211	253	315	63	24.7%
Shaw Street / Car Park Entrance	152	182	211	29	15.8%
Shaw Street / B5155 Greenway Road	717	859	878	19	2.2%

Table 9-19: Runcorn station - percentage impacts - PM peak

Link	2013 Existing	2041 Base	2041 with HS2	HS2 Trips	% HS2 Impact
Station Road	322	385	394	9	2.4%
A533 Queensway slip road	194	232	238	5	2.3%
Cavendish Street (between Lowlands Road and A533 Queensway slip road)	486	582	596	14	2.5%
Lowlands Road	32	38	39	1	3.1%
Cavendish Street (between Lowlands Road and Shaw Street)	403	482	541	59	12.2%
Picow Farm Road	693	829	875	46	5.5%
Shaw Street (station access/forecourt)	130	156	219	63	40.8%
Shaw Street (between Cavendish Street and Car park entrance)	211	253	290	37	14.8%
Shaw Street (between Car park entrance and B5155 Greenway Road)	173	207	232	25	12.2%
Victoria Road	226	270	279	8	3.0%
B5155 Greenway Road (north of Shaw Street)	727	870	881	11	1.3%
B5155 Greenway Road (south of Shaw Street)	605	724	730	6	0.8%
Junctions					
A533 Queensway slip road / Station Road	501	600	614	14	2.4%
Lowlands Road / Cavendish Street	807	966	1026	60	6.2%
Cavendish Street / Shaw Street	286	342	419	77	22.3%
Shaw Street / Car Park Entrance	232	278	326	48	17.2%
Shaw Street / B5155 Greenway Road	869	1040	1065	25	2.4%

9.6.64 The results show that there will be an increase in traffic of circa 40% on the dedicated station access/ forecourt, which is in line with the forecast daily growth in passenger demand due to the Proposed Scheme. The actual increase in trips is however relatively low, with approximately one vehicle per minute in the morning and evening peak hours.

9.6.65 From the station access, traffic generated by the Proposed Scheme is dispersed onto the local road network and the impacts are diluted by the background traffic flows. The highest impacts therefore occur on Shaw Street and Cavendish Street, which are closest to the station. The percentage impact

on Shaw Street is between 12.1% and 15.5% in the peak hours and for Cavendish Street the impact is between 12.2% and 26.8%.

- 9.6.66 The relatively large percentage increases are in part a consequence of the low background traffic flows on the local highway network in the area around the station. With the Proposed Scheme, Shaw Street will have a maximum peak hour traffic flow of 290 vehicles and Cavendish Street, 596 vehicles. The total traffic flows are well within the capacity of these road links.
- 9.6.67 The same pattern exists beyond Shaw Street and Cavendish Street, where the percentage impacts remain high, although the actual increase in trips is low. Once the additional traffic reaches the busier roads e.g. B5155 Greenway Road, the percentage impacts are reduced to below 2%.
- 9.6.68 Similarly, the percentage impacts at junctions close to the station are relatively high.
- 9.6.69 In summary, on the minor roads closest to the station there is capacity to accommodate the trips generated by the Proposed Scheme and once the traffic reaches the busier roads; the percentage impact becomes small and insubstantial. The impact of the Proposed Scheme on the local road network is not therefore a concern.
- 9.6.70 There may be an increase in parking demand and use of drop-off facilities as a result of the increased passenger numbers using the station. The station owner/operator and the local highways authorities may need to give consideration as to any measures to control traffic and parking in the area.

### *Stafford railway station*

- 9.6.71 The Proposed Scheme is planned to have trains stopping at Stafford station, which is expected to result in increased passenger demand. It is forecast that by 2036, passenger demand at Stafford station will increase by 15% as a result of the Proposed Scheme (as compared to the future baseline) and that by 2041 this figure will increase to 16%.
- 9.6.72 Stafford station is located on Station Road/Railway Street around 500m southwest of the town centre. Victoria Park and commercial premises are located immediately to the east of the station. The area to the north is largely commercial and to the south east there is a mix of retail and residential uses. The area to the west/south-west is largely residential.
- 9.6.73 Vehicular access to Stafford station is off Station Road and Railway Street. Access to the taxi and drop-off/pick-up area is off Railway Street. The exit for taxis is onto Station Road. The main station car park is accessed off Station Road and there is a second smaller car park on Railway Street. Station Road is a local distributor, which connects with the A518 Newport Road to the south and Victoria Road to the north.

- 9.6.74 To establish the existing station trip generation, traffic surveys were undertaken at the car park accesses on Station Road and Railway Street and the drop off facility on Station Road/Railway Street.
- 9.6.75 Future baseline traffic volumes are forecast to grow by around 11% by 2041 compared to 2013.
- 9.6.76 The existing vehicular trips to and from the station, along with the future baseline trip generation for 2041 and the estimated trip generation for the Proposed Scheme is shown in Table 21.

Table 9-20: Stafford station trip generation - existing, future baseline, Proposed Scheme

Time period	Arrivals				Departures			
	Car park	Kiss and Ride	Taxi	Total	Car park	Kiss and Ride	Taxi	Total
Existing station trip generation								
AM Peak	58	88	36	182	5	81	30	116
PM Peak	4	87	24	115	62	96	25	183
Future baseline trip generation (2041)								
AM Peak	65	98	40	203	6	90	33	129
PM Peak	4	97	27	128	69	107	28	204
HS2 generated trips (Phase One, 2041)								
AM Peak	11	15	6	32	1	14	5	20
PM Peak	1	15	4	20	11	17	4	32

- 9.6.77 It is estimated that the Proposed Scheme will generate 52 trips in the morning peak hour and 52 trips in the evening peak hour, compared to a future baseline trip generation of 332 and 332 respectively. The peak hour trip generation is only 70% of that considered to be substantial in the sift criteria (75 to 95 trips for a single carriageway road) and as a consequence, the Proposed Scheme will not have a substantial impact on the local road network and no further analysis is considered necessary.
- 9.6.78 There may be an increase in parking demand and use of drop-off facilities as a result of the increased passenger numbers using the station. The station owner/operator and the local highways authorities may need to give consideration as to any measures to control traffic and parking in the area.
- Wolverhampton railway station*
- 9.6.79 The use of released capacity provides the potential for service improvements and reduced crowding for passengers at Wolverhampton station, which is expected to result in increased passenger demand. It is forecast that by 2036, passenger demand at Wolverhampton station will increase by 13% as a result



of the Proposed Scheme (as compared to the future baseline) and that by 2041 this figure will increase to 14%.

- 9.6.80 Wolverhampton station is located on Railway Drive around 400m east of the city centre. The station is bordered by the A4150 Ring Road to the west and to the north, east and south by industrial and residential uses.
- 9.6.81 Vehicular access to Wolverhampton station is off Railway Drive, where there is a one way loop at the station frontage for taxis and drop off/pick up trips. The station car park is also accessed off Railway Drive. Railway Drive is a dedicated station access, which bridges the A4150 Ring Road before connecting with Fryer Street, Piper's Row and Lichfield Street via a signal controlled crossroads. Fryer Street and Piper's Row provide access to the ring road (A4150) via Broad Street and Bilston Street and Lichfield Street connects to Princess Street.
- 9.6.82 To establish the existing station trip generation, traffic surveys were undertaken at the car park access and the taxi/drop off facility on Railway Drive.
- 9.6.83 Future baseline traffic volumes are forecast to grow by around 24% by 2041 compared to 2013.
- 9.6.84 The existing vehicular trips to and from the station, along with the future baseline trip generation for 2041 and the estimated trip generation for the Proposed Scheme is shown in Table 22.

Table 9-21: Wolverhampton station trip generation - existing, future baseline, Proposed Scheme

Time period	Arrivals				Departures			
	Car park	Kiss and Ride	Taxi	Total	Car park	Kiss and Ride	Taxi	Total
Existing station trip generation								
AM Peak	283	5	41	329	234	1	45	280
PM Peak	207	3	30	240	235	5	30	270
Future baseline trip generation (2041)								
AM Peak	351	6	51	408	290	1	56	347
PM Peak	256	4	37	297	291	6	37	334
HS2 generated trips (Phase One, 2041)								
AM Peak	49	1	7	57	40	0	8	48
PM Peak	36	1	5	42	41	1	5	47

- 9.6.85 It is estimated that the Proposed Scheme will generate 105 trips in the morning peak hour and 89 trips in the evening peak hour, compared to a future baseline trip generation of 755 and 631 respectively. The peak hour trip

generation is within the range of trips considered to be substantial in the sift criteria (75 to 95 trips for a single carriageway road).

- 9.6.86 The existing, future baseline and 'with the Proposed Scheme' traffic flows for the morning and evening peak hours are shown in Tables 23 and 24 below, along with the percentage impact on road links and junctions.

Table 9-22: Wolverhampton station - percentage impacts - AM peak

Link	2013 Existing	2041 Base	2041 with HS2	HS2 Trips	% HS2 Impact
Fryer Street	265	320	358	38	11.8%
Lichfield Street	370	447	490	42	9.4%
Piper's Row	306	370	397	27	7.3%
Railway Drive	629	761	867	107	14.0%
Princess Street (north of Berry St)	429	532	553	21	4.0%
Broad Street	725	899	921	22	2.4%
Bilston Street (E of Pipers Row)	954	1183	1207	24	2.1%
Bilston Street (W of Pipers Row)	650	806	808	3	0.3%
Junction					
Fryers Street / Railway Drive / Piper's Row / Lichfield Street	785	949	1056	106	11.2%

Table 9-23: Wolverhampton station - percentage impacts - PM peak

Link	2013 Existing	2041 Base	2041 with HS2	HS2 Trips	% HS2 Impact
Fryer Street	394	476	527	50	10.5%
Lichfield Street	299	362	387	26	7.1%
Piper's Row	254	307	319	12	3.9%
Railway Drive	495	599	687	88	14.7%
Princess Street (north of Berry St)	446	553	565	12	2.3%
Broad Street	937	1162	1187	25	2.2%
Bilston Street (E of Pipers Row)	1203	1491	1500	8	0.6%
Bilston Street (W of Pipers Row)	911	1129	1133	4	0.3%
Junction					
Fryers Street / Railway Drive / Piper's Row / Lichfield Street	721	871	959	87	10.1%

- 9.6.87 The results show the largest impact occurs on Railway Drive, the dedicated station access road. At the end of Railway Drive, traffic is dispersed onto three

roads, namely Fryer Street, Lichfield Street and Piper's Row. Each of these roads is relatively lightly trafficked and the largest percentage increase (11.8%) occurs on Fryer Street in the morning peak hour.

- 9.6.88 From Fryer Street, Lichfield Street and Piper's Row, traffic enters Broad Street, Bilston Street and Princess Street, which provide access to the ring road. The percentage increase on these roads is generally below 3%.
- 9.6.89 In summary, there is capacity on Railway Drive, Fryer Street, Lichfield Street and Piper's Row to accommodate the trips generated by the Proposed Scheme as the background traffic flows are low and the impact on the main roads is within typical daily variations of 5%. The impact of the Proposed Scheme on the local road network is not therefore substantial.
- 9.6.90 There may be an increase in parking demand and use of drop-off facilities as a result of the increased passenger numbers using the station. The station owner/operator and the local highways authorities may need to give consideration as to any measures to control traffic and parking in the area.

#### *Summary of off-route station impacts*

- 9.6.91 The forecast increase in daily passengers as a result of the Proposed Scheme will increase traffic flows at Crewe, Northampton, Rugby, Runcorn, Stafford and Wolverhampton. The increases are not expected to have a substantial impact on the operation of the local road network.
- 9.6.92 The increased traffic flows may increase pressure on car parking and drop off facilities at the stations.